

CLAIMS

1. A process for producing empty capsids of the infectious bursal disease virus
5 (IBDV) [VLPs-pVP2*] which comprises culturing a yeast containing the nucleotide
sequence encoding for a pVP2* protein of IBDV and expressing said pVP2* protein of
IBDV, and if desired recovering said VLPs-pVP2*, where said pVP2* protein of IBDV is a
protein the amino acid sequence of which consists of the amino acid sequence comprised
between residue 1 and residue "n" of the pVP2 protein of IBDV, where "n" is an integer
10 comprised between 441 and 501.

2. A process according to claim 1, comprising the steps of:

a) culturing yeast cells transformed with an expression system comprising the
15 nucleotide sequence encoding for a pVP2* protein of IBDV, under conditions
allowing the expression of said pVP2* proteins and their assembly for forming
VLPs-pVP2* of IBDV; and

b) if desired, isolating and optionally purifying said VLPs-pVP2* of IBDV.
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3. A process according to any of claims 1 or 2, wherein said pVP2* protein of IBDV
is selected from the group formed by:

(i) the pVP2 protein-441, the amino acid sequence of which consists of the
25 amino acid sequence comprised between residue 1 and residue 441 of the
pVP2 protein of IBDV;

(ii) the pVP2 protein-452, the amino acid sequence of which consists of the
amino acid sequence comprised between residue 1 and residue 452 of the
30 pVP2 protein of IBDV;

- (iii) the pVP2-456 protein, the amino acid sequence of which consists of the amino acid sequence comprised between residue 1 and residue 456 of the pVP2 protein of IBDV;
- 5 (iv) the pVP2 protein-466, the amino acid sequence of which consists of the amino acid sequence comprised between residue 1 and residue 466 of the pVP2 protein of IBDV;
- 10 (v) the pVP2 protein-476, the amino acid sequence of which consists of the amino acid sequence comprised between residue 1 and residue 476 of the pVP2 protein of IBDV;
- 15 (vi) the pVP2 protein-487, the amino acid sequence of which consists of the amino acid sequence comprised between residue 1 and residue 487 of the pVP2 protein of IBDV;
- 20 (vii) the pVP2 protein-494, the amino acid sequence of which consists of the amino acid sequence comprised between residue 1 and residue 494 of the pVP2 protein of IBDV; and
- (viii) the pVP2 protein-501, the amino acid sequence of which consists of the amino acid sequence comprised between residue 1 and residue 501 of the pVP2 protein of IBDV.

25 4. A process according to any of claims 1 to 3, wherein said yeast is of the *Saccharomyces* genus or the *Pichia* genus.

5. A process according to claim 4, wherein said yeast is *S. cerevisiae*, *S. pombe* or *P. pastoris*.

30 6. An expression system useful for transforming yeasts, comprising the nucleotide sequence encoding for a pVP2* protein of IBDV operatively bound to transcription, and optionally translation, control elements, where said pVP2* protein is a protein the amino

acid sequence of which consists of the amino acid sequence comprised between residue 1 and residue “n” of the pVP2 protein of IBDV, where “n” is an integer comprised between 441 and 501.

- 5 7. A yeast comprising an expression system according to claim 6.
8. A yeast transformed with an expression system according to claim 6.
9. A yeast according to any of claims 7 or 8, wherein said yeast is of the
10 *Saccharomyces* genus.
10. A yeast according to claim 9, wherein said yeast is *S. cerevisiae* or *S. pombe*.
11. Use of an expression system according to claim 6, or of a yeast according to any
15 of claims 7 to 10, for producing empty viral capsids of the infectious bursal disease virus (IBDV) [VLPs-pVP2*].
12. An empty capsid of the infectious bursal disease virus (IBDV) [VLP-pVP2*]
obtained according to the process of any of claims 1 to 5.
- 20 13. An empty capsid of the infectious bursal disease virus (IBDV) [VLP-pVP2*],
characterized in that it is formed by assembly of pVP2* proteins of IBDV expressed in
yeasts, where said pVP2* protein of IBDV is a protein the amino acid sequence of which
consists of the amino acid sequence comprised between residue 1 and residue “n” of the
25 pVP2 protein of IBDV, where “n” is an integer comprised between 441 and 501.
14. A capsid according to any of claims 12 or 13, wherein said pVP2* protein of
IBDV is selected from the group formed by:
- 30 (i) the pVP2 protein-441, the amino acid sequence of which consists
of the amino acid sequence comprised between residue 1 and
residue 441 of the pVP2 protein of IBDV;

- (ii) the pVP2 protein-452, the amino acid sequence of which consists of the amino acid sequence comprised between residue 1 and residue 452 of the pVP2 protein of IBDV;
- 5 (iii) the pVP2-456 protein, the amino acid sequence of which consists of the amino acid sequence comprised between residue 1 and residue 456 of the pVP2 protein of IBDV;
- 10 (iv) the pVP2 protein-466, the amino acid sequence of which consists of the amino acid sequence comprised between residue 1 and residue 466 of the pVP2 protein of IBDV;
- 15 (v) the pVP2 protein-476, the amino acid sequence of which consists of the amino acid sequence comprised between residue 1 and residue 476 of the pVP2 protein of IBDV;
- (vi) the pVP2 protein-487, the amino acid sequence of which consists of the amino acid sequence comprised between residue 1 and residue 487 of the pVP2 protein of IBDV;
- 20 (vii) the pVP2 protein-494, the amino acid sequence of which consists of the amino acid sequence comprised between residue 1 and residue 494 of the pVP2 protein of IBDV; and
- 25 (viii) the pVP2 protein-501, the amino acid sequence of which consists of the amino acid sequence comprised between residue 1 and residue 501 of the pVP2 protein of IBDV.

15. A capsid according to any of claims 12 to 14, characterized in that it has
30 isometry $T=1$.

16. The use of empty capsids of the infectious bursal disease virus (IBDV) [VLPs-pVP2*], according to any of claims 12 to 15, in preparing a medicinal product.

17. The use according to claim 16, wherein said medicinal product is a vaccine against the avian disease referred to as infectious bursitis, or a gene therapy vector.

5 18. A vaccine comprising a therapeutically effective amount of empty capsids of the infectious bursal disease virus (IBDV) [VLPs-pVP2*], according to any of claims 12 to 15, optionally with one or more pharmaceutically acceptable adjuvants and/or carriers.

10 19. A vaccine according to claim 18, for protecting birds from the infectious bursal disease virus (IBDV).

20. A vaccine according to claim 19, wherein said birds are selected from the group formed by chickens, turkeys, geese, gander, pheasants, quails and ostriches.

15 21. A vaccine for protecting chickens from the infectious bursal disease virus (IBDV) comprising a therapeutically effective amount of empty capsids of IBDV [VLPs-pVP2*], according to any of claims 12 to 15, optionally with one or more pharmaceutically acceptable adjuvants and/or carriers.